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U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

U.S. Department of Transportation

Heavy Truck Safety Plan



Prepared by:
U.S. Department of Transportation
National Highway Traffic Safety Administration
Federal Highway Administration
Research and Special Programs Administration

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PREFACE

Medium and heavy truck safety has improved substantially in recent years. The heavy truck fatal crash involvement rate dropped from more than 5 fatalities per 100 million vehicle miles of travel a decade ago to 3.7 in 1989. Between 1977 and 1988, the fatal crash involvement rate for combination unit trucks decreased 40 percent and for single-unit trucks decreased 30 percent while the equivalent rate for passenger vehicles (cars, light trucks, and vans) decreased only 25 percent. The combined efforts of motor carriers and their drivers coupled with new and expanded State and Federal truck safety programs seem to be working. These successful State and Federal programs include the testing and licensing of commercial drivers, random inspections of vehicles and drivers at roadside inspection points, the screening of drivers for drugs and alcohol, and significant research studies in the areas of motor vehicle and driver performance.*

Despite these successes, crashes involving medium and heavy trucks continue to be a source of great concern. Their fatality rate of 3.7 fatalities per 100 million vehicle miles of travel is over 75 percent greater than the rate of 2.1 for light passenger vehicles. Heavy trucks are currently involved in close to 400,000 police-reported crashes a year. In 1989, these crashes resulted in 5,539 fatalities--12 percent of all U.S. traffic fatalities. Approximately three-fourths of the victims were occupants of other vehicles, one-tenth were nonoccupants, and the remainder were truck occupants. Because these numbers are not insignificant, safety efforts and resources are still required to maintain the positive downward fatality rate trend that has been obtained over the past several years.

Federal-level concern with heavy truck safety is vested in the Department of Transportation, where three agencies are each responsible for different aspects of the problem.

- o The Federal Highway Administration (FHWA) is responsible for ensuring the safe, economical and efficient travel of commercial vehicles (as well as other highway vehicles) on the Nation's highways. The FHWA's Office of Motor Carriers (OMC) has responsibility for setting and enforcing safety regulations for commercial motor vehicles engaged in interstate and foreign commerce. It is also responsible for setting licensing and hours of service standards for commercial vehicle drivers. Under Motor Carrier Safety Assistance Program (MCSAP) grants, administered by the OMC, all participating States enforce the Federal Motor Carrier Safety Regulations (FMCSRs) or compatible State safety regulations on interstate and intrastate trucks.*
- o The National Highway Traffic Safety Administration (NHTSA) is responsible for setting and enforcing safety standards for the design and manufacture of heavy trucks (as well as other highway vehicles).*
- o The Research and Special Programs Administration (RSPA) regulates the transportation of hazardous materials by all modes. RSPA sets and enforces safety standards for hazardous material classification, hazard communication, packaging, operations, routing, training and emergency information. Each operating administration is responsible for enforcing the hazardous materials regulations that apply to its area of authority. For example, FHWA's Office of Motor Carriers enforces RSPA's regulations involving transportation of hazardous materials by highway.*

The National Transportation Policy (NTP) has as one of its major themes to "ensure that the transportation system supports public safety and national security." This includes a focus on all modes of commercial transportation, with particular attention to heavy trucks.

The plans presented in this document describe how the Department will implement the NTP as it concerns heavy truck safety: vehicles, drivers, carriers, roadway design, and the transportation of hazardous materials. With it, the Department hopes to encourage further dialogue with private industry, State and local governments, and the general public on how its programs can be carried out efficiently and effectively.

** Medium and heavy trucks are single-unit or combination-unit trucks (including trailerless "bobtail" truck tractors) having a gross vehicle weight rating (GVWR) of 10,000 pounds or greater. Throughout the remainder of this report we will refer to medium and heavy trucks simply as "heavy" trucks.*

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INTRODUCTION

The Heavy Truck Safety Plan was created to implement the National Transportation Policy (NTP) goals. It describes the Department of Transportation's efforts to improve heavy truck safety for the next three years. The plan was developed as an overview of current and future departmental initiatives for use by government agencies, manufacturers, commercial carriers and drivers, and the public.

The NTP commits the Department of Transportation to improving the safety of heavy trucks, their drivers and the general public that share the road with these commercial vehicles. In an effort to achieve this goal, the Department is cooperating with truck manufacturers, commercial carriers, law enforcement officials, State and local governments, and the general public to identify effective means for improving heavy truck safety.

The Department has facilitated this effort by sponsoring a series of conferences focused on highway safety. In April of 1990, the Department hosted the Traffic Safety Summit in Chicago. Two months later, the Department hosted a Symposium on Effective Highway Accident Countermeasures in Washington, D.C. These conferences were attended by law enforcement officials, transportation industry experts, and highway safety professionals and practitioners from Federal, State, local, and private sector organizations. These conferences acted as forums through which highway safety experts could share their knowledge and experience, provide their views on the most effective highway accident countermeasures, and discuss implementation strategies to enact the highest priority countermeasures. Many of the conferences' discussions addressed strategies for improving heavy truck safety. The Department has considered the ideas developed at these conferences for potential upgrading of the heavy truck safety programs already underway.

Ongoing programs were reviewed jointly by NHTSA, FHWA, and RSPA to ascertain those places where the programs fit together well and those where program changes or wholly new actions might contribute to still better safety. Improvements in six key areas were identified for the Department's heavy truck safety initiatives: Carrier Operations; Driver Behavior and Qualifications; Vehicle Performance Characteristics; Cargo Handling; Roadway Safety; and Accident and Vehicle Condition Data. Individual projects, both old and new, are presented here in each of these areas, along with key milestone dates. Many new initiatives include improved coordination between the three agencies on safety-related issues such as increased truck size and weight, high-tech driver information systems, heavy truck data collection, truck driver licensing, driver training, handling of hazardous materials, and alcohol and drug use by truck drivers. The plan will be revised as needed in response to rulemaking petitions, legislative changes, or other new information developed from our continuing reevaluation of heavy truck safety performance.

CARRIER OPERATIONS



Motor carriers are the companies and owner-operators that provide trucking services. There are tens of thousands of carriers that operate trucks in interstate commerce. Historically, the motor carrier industry, State, and Federal officials have worked closely to promote and improve motor carrier safety. Prior to 1984, the FHWA motor carrier safety personnel were primarily responsible for roadside inspections of commercial vehicles and drivers.

The implementation of the Motor Carrier Safety Assistance Program (MCSAP) in 1984 allowed States to receive funds for the enforcement of Federal and State motor carrier regulations. States have used these funds to train and support State MCSAP officials in assuming the major role in conducting roadside vehicle and driver inspections. Prior to MCSAP funding, 36,000 Federal inspections took place annually. During Fiscal Year (FY) 1990, approximately 3,000 State MCSAP officials conducted over 1.6 million inspections nationwide.

MCSAP funds have also been used to train personnel capable of supplementing the FHWA's efforts in performing carrier safety reviews. FHWA performs carrier safety reviews in order to check for compliance with Federal safety and hazardous materials regulations. The FHWA

safety specialists conduct these safety reviews at the carrier's principal place of business. The FHWA safety review consists of assessing a carrier's management controls. The carrier is asked questions from a questionnaire, and his answers are validated by a limited sampling of carrier records to ensure that the carrier is complying with Federal safety requirements. The FHWA then assigns the carrier a safety rating of "satisfactory," "conditional," or "unsatisfactory."

A compliance review is conducted on carriers receiving less than a satisfactory safety rating, in response to written complaints (carrier drivers, the general public, unions, etc.), or at a carrier's request. The compliance review consists of an in-depth review of the carrier's/shipper's safety operations. A statistically valid sample of carrier/shipper records is undertaken to determine if the carrier's rating should be changed, enforcement action taken, or a program of selective monitoring begun. Every effort is made to ensure that the information obtained from the compliance review is accurate.

In 1990, approximately 450 FHWA safety specialists and 400 MCSAP trained personnel conducted over 16,000 safety reviews and 12,000 compliance reviews. Currently, there are 34 MCSAP funded States and one territory that perform safety reviews. Twelve of these States are currently performing compliance reviews. FHWA plans to expand the safety review program by adding more FHWA safety specialists as well as increasing the number of MCSAP participating States which will assist in the rating process. The FHWA has developed four national programs to complement its rating or "safety fitness" procedures: (1) Educational and Technical Assistance (ETA) Program, (2) Selective Compliance and Enforcement (SCE) Program, (3) Commercial Accident Prevention and Evaluation (CAPE) Program, and (4) Hazardous Materials Program. Brief descriptions of these programs are presented in the following narratives.

CARRIER OPERATIONS SAFETY PROGRAMS

Motor Carrier Safety Assistance Program

Background: The Surface Transportation Assistance Act of 1982 (Section 402) authorized the Secretary of Transportation to provide grants to States for the development of a program for the enforcement of Federal and compatible State motor carrier regulations. This program is called the Motor Carrier Safety Assistance Program (MCSAP) and is administered by the FHWA. As a prerequisite for those receiving these grants, the FHWA requires that States and eligible territories adopt and enforce the Federal Motor Carrier Safety Regulations (FMCSRs) or compatible State regulations. The grants are utilized for inspecting commercial vehicles and drivers at roadside inspection sites and performing safety reviews of carriers in order to check for compliance with safety and hazardous materials regulations. MCSAP is funded at \$60 million annually through FY 1991, \$13 million of which is for the Commercial Driver's License program (see page 10).

Description: In FY 1990, all but four States or territories (Florida, South Dakota, Northern Marianas, and the U.S. Virgin Islands) were participating in MCSAP. Plans for a MCSAP reauthorization for FY 1992 and beyond are underway, including proposed increases in funding and expansion of eligible activities to include weight enforcement. The funds from MCSAP will continue to fund the Drug Interdiction Assistance Program (DIAP), and the Motor Carrier Safety Information Network (SAFETYNET). Descriptions of these two MCSAP-funded programs are found on pages 11 and 43, respectively. In addition, MCSAP participating States will continue to train "safety fitness" inspectors. These inspectors will assist Federal efforts to perform safety and compliance reviews of the carrier's operations at the carrier's principal place of business.

Lead Agency: FHWA

Milestones: Reauthorization of MCSAP funding September 1991

Educational and Technical Assistance Program

Background: The Educational and Technical Assistance Program (ETA) was established to provide educational and technical guidance to the motor carrier and hazardous materials industries, and the general public. It provides a systematic means of prioritizing safety reviews (SRs) of motor carriers resulting in the assignment of initial safety ratings. It also addresses the continued professional development of FHWA staff.

During the initial contact with the motor carrier at the carrier's principal place of business, a motor carrier safety specialist will conduct an on-site safety review of the carrier's safety systems. This review determines whether a motor carrier has adequate safety management controls in place to assure compliance with safety regulations, identifies safety problem areas, and offers educational and technical assistance to the company for correcting identified safety problems. The safety specialist may suggest methods and procedures for safety management controls and operations; offer recommendations to achieve compliance with applicable regulations; discuss positive accident* prevention activities that have been effective for similar carrier operations; and, where appropriate, furnish an information packet to the carrier to enhance regulatory compliance and improve motor carrier safety.

A motor carrier assigned a "satisfactory" safety rating is entered into the ETA Program and continues to receive selected safety information from the FHWA. These carriers will be monitored through a national motor carrier safety data system called SAFETYNET (see page 43). This SAFETYNET system compiles State enforcement and accident data.

Description: The FHWA recently disseminated information to the motor carrier industry including the following publications: "Do you know how to achieve a satisfactory DOT Safety Rating?", "Who must comply with the US DOT Safety Regulations" and other safety information. At the conclusion of January 1991, 40.1 percent of the active motor carriers of record (Population - 227,664) had been rated and 59.9 percent remained unrated.

Lead Agency: FHWA

Milestones: On-going program

* The term "accident" used throughout many of the FHWA program area descriptions typically connotes highway crashes.

Selective Compliance and Enforcement Program

Background: The Selective Compliance and Enforcement (SCE) Program was established to focus compliance and enforcement resources toward those motor carriers believed to present the greatest risk to the public. A carrier with inadequate safety management controls, that is in noncompliance with the safety regulations, and/or is experiencing a significant number of highway accidents is placed in the SCE Program. These carriers are sorted by types of operations posing the greatest risks to highway safety and are scheduled for reviews accordingly.

Description: FHWA's carrier evaluation is through a compliance review (CR) which consists of an on-site investigation of a motor carrier's operation. This investigation evaluates carrier records such as driver hours-of-service, driver qualifications, commercial driver license requirements, vehicle inspection, maintenance and repair, financial responsibility, accident information, and other business records to determine whether a motor carrier has adequate safety management controls in place to ensure acceptable compliance with safety requirements. This level of management control and compliance is reflected in the safety rating issued.

The findings of a CR may result in the following: (1) if the carrier's rating is upgraded to "satisfactory," it is removed from the SCE Program and placed in the ETA Program for continued monitoring, (2) if the carrier's preventable accident rate (proportion of all reportable accidents that are preventable) is high, it may be placed in the Commercial Accident Prevention and Evaluation Program (CAPE, see below for a description of this program), or (3) if the carrier continues to be "unsatisfactory" or is rated "conditional" following a CR, the carrier remains in the SCE Program and is subject to administrative and enforcement actions designed to improve the motor carrier's compliance with the safety regulations.

Lead Agency: FHWA

Milestones: On-going program

Commercial Accident Prevention and Evaluation Program

Background: The Commercial Accident Prevention and Evaluation Program (CAPE) was implemented in FY 1989. CAPE is designed to assist motor carriers in analyzing accident data, identifying potential safety problem areas, and initiating countermeasures to reduce the risk of accidents. The CAPE Program candidates are generally selected from medium and large motor carriers (20 or more drivers) whose preventable accident rate is .30 or greater, and would have received a satisfactory safety rating if this preventable accident rate was not included in their safety rating.

Description: In FY 1989, slightly more than 1 percent of FHWA's available field staff hours were utilized in administering the program (over 6000 staff hours). Preliminary information developed from an analysis of one region's program accomplishments indicated that a relationship exists between a carrier's reduction in the preventable accident rate, attendant cost savings, and the carrier's participation in the program. These initial results indicate that the program is effective in reducing preventable accidents. In FY 1991, the findings of a contractual study on preventable accident countermeasures will be incorporated into the CAPE Program.

Lead Agency: FHWA

Milestones: On-going program

Publish Study on
Preventable Accident
Countermeasures

FY 1991

COMMERCIAL DRIVER BEHAVIOR AND QUALIFICATIONS



Medium and heavy truck drivers have the most direct responsibility for the safe operation of their vehicles. They must: (1) be trained and experienced, (2) evaluate the safety of the vehicles they operate, (3) keep records on their hours of service, (4) evaluate their own fitness to operate a vehicle safely (including being drug and alcohol free when operating a vehicle), and (5) operate their vehicle in a safe manner at all times. Ensuring that commercial drivers take these responsibilities seriously is the job of law enforcement officers, State truck officials, and the Office of Motor Carriers.

The Federal Highway Administration (FHWA) has the major responsibility for administering the Federal Motor Carrier Safety Regulations (FMCSR) concerning driver safety applicable to commercial motor vehicles during highway operation in interstate commerce. In addition, FHWA administers the Commercial Motor Vehicle Safety Act of 1986 (CMVSA), which was enacted to establish national standards for testing and licensing of commercial drivers and to require drivers to have a single classified license and record. NHTSA is responsible for providing technical assistance to the States with regard to all drivers--including truck and bus operators--to improve enforcement of traffic laws, for promoting the improvement of more effective and uniform licensing procedures, and for promoting increased occupant protection. This section of the heavy truck safety plan emphasizes NHTSA's and FHWA's complementary roles in commercial vehicle safety by focusing on traffic law enforcement of rules of the road relating to commercial vehicles and promoting State conformance with FHWA's commercial driver licensing requirements.

COMMERCIAL DRIVER BEHAVIOR AND QUALIFICATIONS SAFETY PROGRAMS

Commercial Driver's License Program

Background: The Commercial Motor Vehicle Safety Act of 1986 established the Commercial Driver's License (CDL) Program to improve highway safety by ensuring that drivers of various classes of commercial vehicles have only one driver license and are qualified to operate the vehicle. These classes typically include any vehicle that has a gross weight rating greater than 26,000 pounds, or is designed to transport more than 15 passengers, or is designed to carry placarded amounts of hazardous materials. Unlike most other Federal safety requirements, the CDL requirements cover intrastate as well as interstate and foreign commerce operations. There is \$13 million available through FY 1991 for the States to implement the CDL program. States must be in substantial compliance with the Act by October 1993 or risk losing Federal-aid highway funds.

The Act retained the States' right to issue a driver license, but established minimum Federal standards that States must meet when testing and issuing a commercial driver's license. The FHWA has developed the standards that States must use to test, license, and disqualify commercial motor vehicle drivers including: (1) requiring a driver to have no more than one license, (2) establishing minimum standards for State testing and licensing of commercial drivers, (3) establishing .04 percent as the level of alcohol concentration in the blood at which a driver is deemed to be driving under the influence, (4) defining "excessive speeding," "reckless driving," and other serious moving violations, and (5) requiring States to participate in the Commercial Driver's License Information System (CDLIS).

Description: All drivers of commercial vehicles must possess a CDL in order to drive a commercial motor vehicle after April 1, 1992. As of May 1991, all 51 licensing jurisdictions (50 States and the District of Columbia) had passed legislation to implement CDL programs and 38 were issuing CDLs based on new knowledge and skill tests. The FHWA's Office of Motor Carriers has formed a CDL Implementation Team to assist the States in the implementation of the CDL program. Also, the FHWA is performing research to evaluate various methods of ensuring license uniqueness and driving simulators for testing and training drivers (see page 13). Additionally, materials are being developed to assist drivers with reading difficulties so as to aid them in preparing for the CDL tests.

Lead Agency: FHWA

<u>Milestones:</u>	CDLs issued by 38 jurisdictions	May 1991
	CDLs issued by an additional 11 jurisdictions	December 1991
	CDLs issued by remaining two jurisdictions	1992

Drug Interdiction Assistance Program

Background: The national motor carrier drug enforcement initiative grew from the realization that drug use among drivers of commercial motor vehicles directly affected the safety of all who use the nation's highway system. In June 1988, the first National Motor Carrier Drug Enforcement Plan was developed. Specifically, the goals were to provide "seed" money to States to encourage the development of innovative drug enforcement programs aimed at reducing both the illegal transportation of illicit drugs and the use of drugs within the motor carrier industry. An adjunct of the program was the training of MCSAP vehicle inspectors to implement these programs.

The original drug enforcement program, which was designed to be a short term project, concluded at the end of FY 1989. The Drug Interdiction Assistance Program (DIAP) was subsequently developed from experience gained in the original project. DIAP is an on-going program aimed at interdicting the illegal transportation of drugs in commercial motor vehicles and removing commercial vehicle operators driving under the influence of drugs.

Description: In FY 1990, 11 States submitted DIAP enforcement plans and signed grant agreements. Although current program funding levels limit the number of participating States, the FHWA will be encouraging all 50 States to develop and implement drug interdiction programs targeting commercial motor vehicles.

Lead Agency: FHWA

Milestones: On-going program

Commercial Vehicle Enforcement Pilot Program

Background: Police officers in many jurisdictions have not focused on enforcement strategies for heavy trucks because of their many other responsibilities, lack of adequate training on what to look for after the initial stop, and the potential safety problems of pulling trucks over to the side of most roads. However, traffic law violations, particularly those involving speeding, alcohol, and drugs, contribute to heavy truck crashes. Improved detection skills and renewed emphasis on heavy truck enforcement need to be communicated to police officers. This can be done best by providing training guidelines for the States through the development of training guides and lesson plans covering enforcement strategies for officers assigned to traffic duties. To support these efforts, NHTSA, FHWA and the California Highway Patrol have cooperated in a series of joint programs under the title of the Commercial Vehicle Enforcement Pilot Project (CVEPP). Completed CVEPP projects to date are: 1) publication and distribution of Commercial Vehicle Enforcement: A joint NHTSA/FHWA Guide for Law Enforcement Managers, to aid State enforcement managers in developing a program aimed at increasing commercial vehicle safety; 2) performance of a comprehensive review of existing commercial enforcement programs at seven jurisdictions which resulted in short-term recommendations aimed at enhancing the commercial enforcement programs; 3) the implementation of the short-term recommendations which could be adopted within the framework of the existing authorities and resources. This phase also included the publication and distribution of Commercial Vehicle Enforcement: A Guide for Police Traffic Personnel which details recommended enforcement strategies for improving commercial vehicle safety.

Description: The final stage of this project is to enact the strategies aimed at reducing commercial vehicle crashes that are developed in the Guide for Police Traffic Personnel. The CVEPP has reviewed sites nominated by FHWA and NHTSA regional offices for implementing these strategies for heavy truck enforcement by police personnel normally assigned to traffic-related duties. Six sites--one each in Alabama, Colorado, Hawaii, Kansas, Virginia, and Washington--were recently selected for enhanced training of road patrol officers. This training will focus on the enforcement of consequential traffic laws such as drunk/drugged driving, speeding, safety belt use, and compliance with licensing laws. Areas of concentration will also include the training of drug interdiction techniques, enforcing hours of service restrictions, and verifying driver qualifications. Patrol officers are being trained to look beyond the traffic ticket for violations of motor carrier safety regulations pertaining to both the driver and the equipment.

Lead Agency: NHTSA

<u>Milestones:</u>	Program becomes operational at project sites	October 1991
	Data collection from project sites end	1992
	Publication of final report documenting the program effectiveness	1992

FHWA Mandatory Drug Testing Program

Background: In November 1988, the FHWA issued final regulations requiring all motor carriers to establish an antidrug program for those drivers operating commercial motor vehicles in interstate commerce. Approximately 200,000 interstate motor carriers are affected by these regulations. The drug testing rule complements an existing regulation that prohibits a driver from using controlled substances, such as heroin or cocaine, while operating a commercial motor vehicle in interstate commerce. A person may be disqualified from operating a commercial motor vehicle for the illegal possession, use, or transportation of these drugs. Motor carriers with 50 or more drivers began testing in December 1989. All other motor carriers began testing in December 1990.

Description: Motor carriers are required to test drivers prior to employment, biennially, on a random basis, for reasonable cause, and after certain accidents. These drivers are to be tested for five classes of drugs, i.e., marijuana, cocaine, opiates, amphetamines, and phencyclidine (PCP). There are many other requirements outlined in the FHWA and OST drug testing regulations that must be followed by motor carriers. Several organizations have filed lawsuits challenging certain parts of the new requirements. Subsequently, a U.S. District Court issued a preliminary injunction which stayed the FHWA's enforcement of random testing and certain post-accident testing (other than reasonable cause). That decision was appealed to the U.S. Court of Appeals for the 9th Circuit, which has ruled in favor of the FHWA drug testing regulations (see Random Controlled Substance Testing, page 16).

Lead Agency: FHWA

Milestones: On-going program

Truck Occupant Safety Belt Use

Background: As of March 1991, 38 States and the District of Columbia had enacted safety belt laws, but these laws generally are not applicable to heavy trucks. The safety belt usage rate for automobile occupants is now nearing 50 percent. From 1983 through 1989, an estimated 20,086 lives were saved by safety belts--14,191 of which were associated with belt use laws. Even though FHWA's regulations require truck drivers to wear their safety belts, the belt usage rate for occupants of heavy trucks is less than 10 percent. NHTSA data indicates that total or partial ejection is involved in 38 percent of all combination-unit truck occupant fatalities. The experience of NHTSA's corporate safety belt use program indicates that management support, education, and increased awareness of the risks of nonuse of safety belts have increased safety belt usage by employees. Many employers who promote belt use programs reach employee belt use rates of 70 to 90 percent. Such a program directed at the trucking industry could substantially increase belt usage by heavy truck occupants.

Description: This initiative for the motor carrier industry will be similar to the safety belt program being implemented by many corporations in the United States. The program starts with a policy commitment by corporate management that safety belts will be used by the drivers. Educational activity about the merits of belt use, coupled with incentives and even sanctions, ultimately will have a beneficial effect. Recordkeeping to provide a measure of the success or failure of the program would be included. NHTSA and FHWA will work closely with the American Trucking Associations and other trucking associations to develop this program in more detail.

Lead Agencies: FHWA and NHTSA

Milestones: Cooperating trucking companies August 1991
implement corporate safety belt program

COMMERCIAL DRIVER BEHAVIOR AND QUALIFICATIONS RESEARCH PROGRAMS

Simulators Used for Commercial Driver Training and Testing

Background: The use of driver simulators has been proposed on the premise that their widespread use could increase the States' testing and licensing capabilities. Simulator manufacturers have said that currently available simulation technology can be used by the States in commercial driver testing. An advanced higher-fidelity, motion-based driving simulator suitable for vehicular or advanced human behavioral research has also been proposed and the feasibility is being considered by the Department (See Advanced Driving Simulator, page 14).

Description: The FHWA will investigate the feasibility and desirability of using driver simulators to test and/or train drivers of commercial motor vehicles. The tasks that will be performed include: (1) isolate the testing, training and human factors research needs to be met by simulation, (2) conduct a literature review and assess currently available simulation technology within and outside of the motor carrier industry, (3) publish various sets of operational performance specifications and associated estimated costs for a complete range of commercial driving simulators, and (4) complete a user benefit trade-off analysis.

Lead Agency: FHWA

Milestones: Construct a prioritized list of
features for alternative simulator
configurations

Mid-1991

Advanced Driving Simulator

Background: Accident causation studies have consistently shown human factors to be the leading causal or contributory agent in highway crashes. Efforts to address these problems, however, have been frustrated by a lack of understanding of the complex interactions that occur between drivers, their vehicles, and the roadway environment during accident situations. The advanced driving simulator was proposed as a means of "untangling" these interactions so that high-technology driving aids, coupled with vehicle and roadway improvements, can be developed which will significantly improve traffic safety.

NHTSA's advanced driving simulator program is designed to facilitate development of a motion-based research simulator which can be used to evaluate behavioral and vehicular performance under a wide range of artificial environmental conditions. The major objective for performing simulator tests is to identify and evaluate vehicular crash causation factors resulting from: (1) vehicular performance characteristics including vehicle dynamics, instability, poor road conditions, or (2) human behavioral characteristics including inexperience, sleepiness, impairment, etc. These tests could be run in a controlled, safe environment. The construction of the simulator is to be funded by the public and private sector. A recently completed feasibility study by the University of Iowa indicates that the simulator project is technically and economically feasible.

Description: A Simulator Project Group has been formed to oversee the preparation of the Transportation Systems Acquisition Review Council (TSARC) document. The document will lay out the details concerning project alternatives, funding and procurement strategies, legal issues, scheduling, costs, etc. Upon review and approval by TSARC and the Deputy Secretary, the next objective of the Simulator Group will be to have independent contractors establish function specifications (based on user requirements) for the simulator and the various mechanical subsystems. After establishment of the function specifications, a prime System Engineering contractor would need to be hired to ensure that contract specifications are met by the various system subcontractors.

Lead Agency: NHTSA

<u>Milestones:</u>	Submit TSARC document	1991
	Develop public/private funding strategies	1991
	Establish function specifications	1991
	Establish final contract specifications for the different subsystem contractors	1992

Commercial Driver Medical Qualifications

Background: Commercial motor vehicle drivers are required, under the Federal Motor Carrier Safety Regulations, to be medically qualified. A medical examination is required at least every two years and is to be based on a series of medical standards promulgated by the Federal Highway Administration. The FHWA is continually reviewing these standards and the associated guidance and procedures to reflect current medical and technological advances. This comprehensive research program will lead to improved medical standards for commercial motor vehicle drivers.

Description: Conferences of medical experts in the areas of respiratory and pulmonary conditions, and psychiatric conditions were held recently and conference reports are expected soon. The reports will include recommendations to the FHWA on any changes to the current standards, guidance and/or procedures regarding these medical conditions.

Several research projects are currently underway or planned for improving medical standards for commercial vehicle drivers. The FHWA is exploring advances in the medical field that may assist vision and hearing-impaired drivers. This research will be accomplished by performing an extensive literature search and hosting conferences attended by vision and hearing experts. This research will also address the need for revisions to the current standards. In addition, a research contract was recently awarded to prepare a detailed regulatory evaluation of FHWA's proposed rule regarding insulin-using diabetic drivers. This contract will also evaluate alternatives for providing FHWA with on-going information about medical conditions that may affect driver operating qualifications.

Lead Agency: FHWA

<u>Milestones:</u>	Complete Conference Reports	1991
	Award Hearing and Vision Research	1991
	Complete Diabetes Contract	1991

Prototype State Medical Review Program

Background: Commercial drivers must be medically examined and certified as physically qualified at least every two years by a physician. A medical examiner's certificate or "card" must accompany a driver while operating a commercial vehicle. Current regulations for enforcing a commercial driver's medical condition are handled through roadside inspection and terminal review of a driver's medical card. The legislation that established the CDL licensing process provides the authority to permit the States to take responsibility for determining drivers' medical qualifications. The direct involvement of the States in determining qualifications would provide the opportunity to improve the efficiency, effectiveness, and enforceability of the driver medical qualifications.

Descriptions: The FHWA will work with a committee of State licensing personnel to develop criteria and prototype programs that will allow States to directly review and assess commercial driver medical qualifications. The next step will be to conduct a series of pilot medical programs in up to seven States. The FHWA will then consider rulemaking to allow the States to assure the physical qualifications of commercial motor vehicle drivers as part of the CDL application and licensing procedure.

Lead Agency: FHWA

Milestones: Pilot and evaluate up to seven prototype programs to assess commercial driver medical qualifications 1992

Random Roadside Controlled Substance Testing Survey

Background: Numerous studies have been completed in recent years concerning the issue of controlled substance abuse. Although they have provided valuable data, none of these studies has yet fully substantiated the levels of drug use/abuse in the motor carrier industry. Accurate and qualified data on the extent of substance use/abuse levels are needed so that, if necessary, modifications or additions can be made to existing programs.

Description: The FHWA will perform research to determine if substances, other than those currently required for testing, are being abused. The FHWA will conduct a pilot survey using random drug testing, and estimate the current level of controlled substance use by commercial drivers.

Lead Agency: FHWA

Milestones: Complete a pilot survey of approximately 400 drivers May 1991

Conduct a nationwide survey project of controlled substance testing of approximately 1600 drivers in nine geographic areas 1992

Driver Fatigue and Alertness Study

Background: The Federal Motor Carrier Safety Regulations addressing hours-of-service for commercial motor vehicle drivers were adopted over 50 years ago to promote improved highway safety by reducing the frequency of accidents in which driver fatigue was a factor. There is a need to reassess these regulations in light of advances in both scientific research on fatigue and the technological and operational changes that have occurred within the motor carrier industry.

The Truck and Bus Safety and Regulatory Reform Act of 1988 directed the FHWA to study relationships among the hours-of-service regulators, driver fatigue, and commercial motor vehicle accidents. A report was submitted to Congress in December 1990. The 4-year Driver Fatigue and Alertness Study was initiated to respond fully to the Congressional charge.

Description: The FHWA will establish measurable relationships between commercial motor vehicle driver activities and physiological indicators of fatigue and reduced driver alertness. This will be done through the collection of data during revenue runs by over-the-road and local/short-haul motor carriers. Prior to this work, a pilot test will be performed to verify the test equipment, procedures, and analysis methods. In addition, potential countermeasures for increasing alertness and reducing fatigue will be studied. An assessment will be made on the feasibility of using a laboratory simulator for studying driver alertness.

Lead Agency: FHWA

<u>Milestones:</u>	Pilot test of physiological and performance monitoring equipment completed	Summer 1991
	Collect and analyze physiological and performance data on 60 commercial motor vehicle drivers	1991-1992
	Conduct a survey of 800 drivers on legal alertness-enhancing measures	1993

Enforcement of Hours-of-Service Rules

Background: The FHWA's Federal Motor Carrier Safety Regulations (FMCSR) define the requirements for commercial motor vehicle (CMV) driving and on-duty time. They ensure, to the extent possible, that fatigued drivers are not operating commercial motor vehicles on the public highways. Under the FMCSRs, drivers may not drive, nor may motor carriers allow or require a driver to drive, more than 10 hours following 8 consecutive hours off-duty. Drivers also may not drive if they have been on-duty 15 hours following 8 consecutive hours of off-duty time. Drivers also may not drive after they have been on-duty 60 hours in 7 consecutive days or 70 hours in 8 consecutive days.

The actual extent to which drivers adhere to these rules is unknown. Often heard is the claim that a significant number of drivers violate the rules in order to complete revenue runs without interruption, either at their own instigation or as a result of carrier or shipper instructions to do so. Enforcement of the hours-of-service regulations, therefore, has been a critical issue for Federal and State safety personnel to determine and for the FHWA to assess.

Description: In 1989, the OMC initiated a contractual study of various States' enforcement activities. The contract was to answer the question: "Do higher fines result in fewer fatigue-related accidents?" Results of the contract were inconclusive due to the inability of the States examined to track their fines and penalties assessed for hours-of-service violations. There was also a lack of uniformity in how States classify or report "fatigue-related accidents."

Both of these concerns are being addressed through the Commercial Vehicle Safety Alliance. Currently, there are no plans to initiate another study until the FHWA is satisfied that the States (1) have systems to adequately track their fines and penalties assessed for hours-of-service violations and (2) there is greater uniformity in how States classify or report "fatigue-related accidents."

The Special Services Division of the Arizona Department of Public Safety is currently conducting a study under the MCSAP with the goal of reducing CMV accidents by identifying and removing fatigued and impaired drivers from the transportation system. A "Truck Operator Proficiency System" has been developed and is currently undergoing testing under controlled conditions. This will be followed by field validation for use in enforcement.

The FHWA continuously monitors driver out-of-service procedures for needed improvements. Through MCSAP program funding, the number of driver and vehicle inspections performed annually has been increased dramatically. In addition, to funding these inspection activities, the FHWA has scheduled a resource project for FY 1992 that will evaluate the shipper's role in motor carrier hours-of-service violations.

Lead Agency: FHWA

Milestones: On-going program

Use of On-Board Recording Devices

Background: Federal Motor Carrier Safety Regulations (FMCSRs) require drivers to record their duty status, in duplicate, on a specified grid, for each 24-hour period. Drivers must record time spent driving, on duty but not driving, in an in-cab sleeper berth, and off duty. Since the advent of automatic on-board recordkeeping devices, motor carriers and their drivers have had the option of using the devices as an alternative to maintaining manual duty status records.

On October 1, 1986, the FHWA received a petition from the Insurance Institute for Highway Safety, asking that these devices be mandated. Having initiated a waiver program a year earlier to permit interested motor carriers to test these devices, the FHWA chose instead to advocate voluntary use pending receipt of more information on the relative cost-effectiveness of these recorders.

Description: Evaluation of the computer records of motor carriers using the devices indicates that, overall, their drivers' compliance with the hours-of-service rules is good. Driver acceptance of the devices, initially a concern of the FHWA, also appears to be good. Equipment and installation costs may be a deterrent to their wider use.

While a number of these devices are on the market, Federal rules require that all must provide the following basic information related to hours-of-service: (1) the starting time; (2) driving time; (3) time on duty, but not driving; (4) total miles driven in a single day; (5) total hours; (6) sleeper berth use; and (7) off duty time. The value of these devices lies in their accurate documentation of driver activities and provision of information on the operation of vehicle systems. They may induce drivers to comply with FMCSR driving and on-duty rules. However, there is no specific evidence to date to confirm whether on-board recording devices do increase compliance. On-board recording devices provide neither a direct indication of the driver's physiological or psychological state, nor notify the driver when alertness is jeopardized.

Also, warning devices already exist which do not require the use of an on-board recorder for their operation. Use of these, like that of the on-board recorder, remains a voluntary decision for the motor carrier.

Lead Agency: FHWA

Milestones: The Office of Motor Carriers is continuing to evaluate evolving technologies that can enhance motor vehicle safety, including in the assessment devices like onboard recorders.

Prohibition of Radar Detectors in Commercial Motor Vehicles

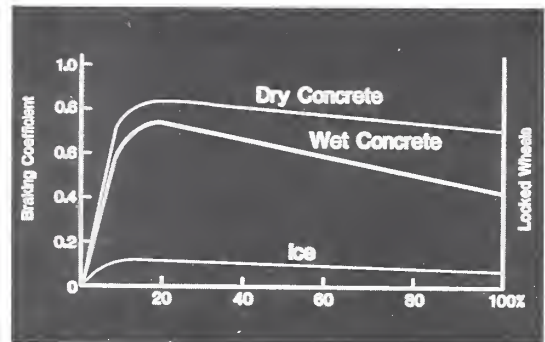
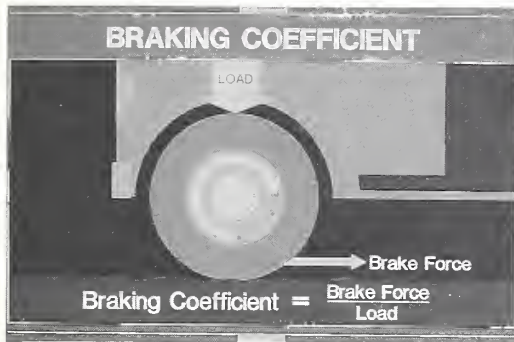
Background: Commercial operators are required to adhere to State speed laws governing their motor vehicles. Some operators carry radar detectors in their tractors in an apparent attempt to exceed such laws without detection and citation for violations.

Description: The FHWA recently received a petition from the Insurance Institute for Highway Safety and seven other organizations advocating the abolition of radar detectors in commercial motor vehicles. The FHWA accepted the petition and is considering a rulemaking prohibiting such devices in commercial trucks and buses.

Lead Agency: FHWA

Milestones: Rulemaking Decision 1991

VEHICLE PERFORMANCE CHARACTERISTICS



Vehicle characteristics play a critical, if somewhat unrecognized and underreported, role among the many factors that contribute to truck crashes. Even where these factors do not directly cause a crash, vehicle factors may make it difficult or impossible for a driver to recover from an error or avoid an unforeseen conflict. Once a crash occurs, the design of a truck can affect the severity of trauma sustained by the occupants of all vehicles involved.

This section addresses four vehicle-related research areas which the Department of Transportation has targeted for improving heavy truck safety. They are: Vehicle Handling and Braking Performance; Driver/Vehicle Interaction; Occupant Protection; and Vehicle In-Service Performance Evaluation. Proposed research projects for possible support of potential rulemaking initiatives or to identify heavy truck safety problems are planned for many of these areas. The proposed research and rulemaking initiatives in each of these four vehicle-related areas are detailed in the following section. In addition, safety programs aimed at ensuring that currently mandated safety features are maintained on newly manufactured heavy trucks are also described.

VEHICLE PERFORMANCE CHARACTERISTICS SAFETY PROGRAMS

NHTSA's Office of Enforcement's primary activity is to perform defects investigation and ensure that manufacturers comply with mandated safety features. The defects investigation function is responsible for conducting the testing, inspection, and investigation necessary for the identification and correction of safety-related defects in motor vehicles (including heavy trucks) and motor vehicle equipment. The vehicle safety compliance function is responsible for conducting the testing, inspection, and investigation necessary to assure compliance by foreign and domestic motor vehicle and equipment manufacturers with the Federal Motor Vehicle Safety Standards (FMVSS).

Heavy Truck Defects Investigations

Background: NHTSA initiates investigations after being contacted by individuals and companies that submit written complaints or evidence of a potential safety-related vehicle problem, or call the agency's "Hot Line" to report an alleged problem. Between June 1987 and June 1989, of 32,671 Vehicle Owners Questionnaires received, only 173 or 1/2 percent pertained to heavy trucks or semitrailers. Since 1975, an average of 34 heavy truck safety recalls have occurred each year, of which two (6 percent) were influenced by NHTSA. This compares to an annual average of 61 passenger car recalls with ten (16 percent) being influenced by NHTSA. Since 1975, NHTSA has influenced, in terms of vehicle population, 55 percent of the passenger car recalls and 17 percent of the heavy truck recalls. Although the reasons for this disparity are not fully clear, it is possible that many truckers are not aware of NHTSA's vehicle defects function. Other truckers may be concerned that if they voluntarily report a problem to NHTSA the vehicle would be "put out of service." Thus, a prime source of information is not available for initiating heavy truck investigations.

Description: A new "Hot Line" brochure designed specifically for the heavy truck industry will be developed.

Lead Agency: NHTSA

Milestones: Complete development and begin distribution of brochures October 1991

Compliance Testing of Heavy Trucks

Background: Presently, 22 Federal Motor Vehicle Safety Standards (FMVSS) apply to heavy trucks. Under the National Traffic and Motor Vehicle Safety Act of 1966, manufacturers are required to certify that each vehicle sold in the United States is in compliance with all applicable FMVSS. NHTSA monitors compliance by inspecting and testing a sample of vehicles, and by requesting and reviewing manufacturers' certification documents. Compliance with 10 of the applicable FMVSS can be visually evaluated. Due to the high purchase price of heavy trucks and difficulties encountered in short-term renting or leasing, much of the surveillance has relied upon examination of manufacturers' certification documents.

The agency has tested heavy trucks and heavy truck equipment to the following FMVSS: 106 (brake tubing), 108 (lamps), 119 (tires), 120 (tires and rims), 121 (air brakes), 206 (locks and latches), 209 (seat belts), and 302 (flammability of interior materials). Testing of heavy truck brake systems (under FMVSS 121) has been limited to equipment and dynamometer testing since the court ruling of October 13, 1978, suspended the standard's stopping distance requirements.

Description: In November 1990, NHTSA initiated a program to visually inspect heavy trucks at local dealerships for FMVSS compliance. NHTSA supplements these data as required by requesting information and data from truck manufacturers. Testing of heavy trucks and heavy truck equipment items will be expanded to additional standards to the extent feasible.

Lead Agency: NHTSA

Milestones: Perform nondestructive FMVSS testing on heavy trucks On-going program

VEHICLE BRAKING AND HANDLING PERFORMANCE RESEARCH PROGRAMS

The heavy truck driver's ability to make the vehicle go in the direction chosen at the speed chosen is ultimately limited by the vehicle's response to steering and braking. Therefore, NHTSA has conducted continuing research and regulatory activities on truck braking and handling. In response to Section 216 of the Motor Carrier Safety Act of 1984, vehicular performance with respect to heavy trucks was evaluated in the Heavy Truck Safety Study. This study, submitted to Congress in March 1987, identified various vehicle-related factors which contributed to the cause of truck accidents. NHTSA's work is currently focused on optimizing today's brake systems, and on assessing the reliability of components/designs that can significantly improve the performance of heavy trucks in braking maneuvers. Issues of tractor-trailer compatibility and brake adjustment are also being addressed.

Stopping Distance & Controllability

Background: In April 1991, NHTSA submitted a report to Congress on "Improved Brake Systems for Commercial Motor Trucks." The Report describes what can reasonably be done to improve heavy truck air brake system performance. One major area identified for potential improvement is enhancement of the vehicle's ability to stop stably and under control in as short a distance as possible.

NHTSA is pursuing research and rulemaking activities in the area of improved stopping distance and controllability during braking for heavy trucks. Two phases are planned for this initiative. Phase I focuses on reestablishing stopping distance performance requirements for heavy trucks. Previously established stopping distance requirements had been invalidated by a 1978 court decision. Brake component improvements, such as adding "bobtail" proportioning valves and removing steering-axle automatic brake pressure limiting valves, may be required to meet these vehicle braking performance requirements. Phase I also is concerned with brake pressure threshold requirements for both tractors and trailers to ensure that tractor and trailer manufacturers produce vehicles with compatible braking systems. Phase II addresses braking-induced instability and loss of control. Implementation of this phase could necessitate hardware such as antilock brakes.

Description: The necessary research for Phase I has been completed. NHTSA is now considering whether to modify current brake system stopping distance requirements. Phase II requires the completion of several research efforts. Currently underway are efforts to evaluate the performance of various antilock brake systems and antilock braking strategies, e.g., individual wheel control, axle by axle control, tandem axle control, etc. Supporting research is being performed to evaluate the incremental benefits of the various braking systems and strategies. This research consists of a 40-month fleet study to assess the reliability, maintainability, and life-cycle costs associated with the use of antilock brakes in both tractor and trailer fleet service.

Lead Agency: NHTSA

Milestones:

Phase I	Regulatory Decision on Phase I	1991
Phase II	Complete tractor portion of fleet study	July 1991
	Complete other research activities supporting Phase II issues	September 1991
	Decision on further agency action	December 1991
	Complete trailer portion of fleet study	1993

Brake Adjustment

Background: Proper brake adjustment is critical for maintaining safe stopping performance. Automatic brake adjusters have been developed as one approach to improve brake adjustment. This will help ensure that the brakes are properly adjusted between inspections. NHTSA has completed a fleet study to quantitatively assess the performance, reliability, and life-cycle costs of automatic brake adjusters as compared to manual brake adjusters. Several models of automatic brake adjusters were found which provide improvements relative to manual adjusters, while some experienced problems in certain applications.

Description: A report documenting the results of the fleet study was issued in April 1991. Based on the results of the study, a Notice of Proposed Rulemaking (NPRM) was published in the Federal Register on May 3, 1991. The NPRM proposed a regulation that would require all heavy trucks with either air or hydraulic activated brake systems to be equipped with automatic brake adjusters and adjustment indicators. NHTSA is presently evaluating comments received in response to this proposal.

Lead Agency: NHTSA

Milestones: Complete Rulemaking 1991

Brake Lining Compatibility

Background: Inadequate or misleading coding, identification, or performance ratings of brake linings and valves add to the difficulties truck operators now have in maintaining balanced braking on their vehicles. In 1989, the agency granted a petition requesting that NHTSA develop standards for identification of brake linings.

Description: Research is underway to develop test procedures for brake lining performance and marking. This work is being conducted at NHTSA's Vehicle Research and Test Center (VRTC), based upon procedures developed by the Society of Automotive Engineers (SAE). Initial attempts to implement the SAE procedure have not been successful. SAE has been asked to expedite a revision to its recommended procedure. A decision on whether or not to proceed to rulemaking can be made following completion of this research effort.

Lead Agency: NHTSA

<u>Milestones:</u>	Completion of test work at VRTC	December 1991
	Regulatory decision on brake lining compatibility	1992

Advanced Truck Design for Larger and Heavier Trucks

Background: A recent report by the Transportation Research Board offered the opinion that the design capacity of interstate bridges and pavements can accommodate vehicle weights in excess of the currently allowed 80,000 pounds. A number of larger and heavier truck designs (e.g. multitrailer vehicle combinations weighing up to 131,000 pounds) were included in that report as a means of increasing trucking productivity. Although the Department has taken no position on the desirability of larger, heavier trucks, the Department is considering the safety implications of such vehicles. Before permitting such vehicles, safety concerns must be carefully considered including requirements for additional equipment and operating procedures.

Description: NHTSA and FHWA are studying safety implications of larger and heavier trucks and any resulting need for additional safety equipment. Among the safety features that are being considered are: antilock brakes, stability enhancements (e.g., improved coupling devices, reduced rearward amplification, improved rollover stability), and improved occupant restraints. Additional driver training and qualification requirements, more stringent operating procedures, and special permitting are also being studied. In order to contribute to the determination of what potential safety requirements are effective and realistic, coordination between NHTSA and FHWA has been initiated. Once these requirements are identified, the Department must complete any research that might be needed to support their development.

Lead Agencies: FHWA and NHTSA

<u>Milestones:</u>	Identify and complete required research to address safety implications of larger/heavier trucks	May 1991
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Rollover/Rearward Amplification Research

Background: In the near future, it is anticipated that larger more productive trucks may be proposed for operation on many portions of our nation's highway system where they are currently not allowed. The vehicles under consideration are single, double, even possibly triple-trailer combinations with gross weights up to 131,000 pounds. The handling and stability characteristics of these larger and heavier vehicles may need to be carefully controlled in order to achieve similar safety characteristics to the smaller and lighter trucks they would replace.

Description: NHTSA is developing test procedures for measuring the rollover propensity and rearward amplification tendencies (during high-speed obstacle avoidance maneuvers) of the new group of proposed larger and heavier trucks. In addition, NHTSA will perform a limited amount of full-scale vehicle testing of triple combinations and will film demonstrations that validate the safety performance improvements that can be achieved with various types of convertor dollies.

Lead Agency: NHTSA

Milestones: Complete study and issue report

July 1991

Innovative Convertor Dollies

Background: The most common multiarticulated vehicle operation in the United States is a tractor-semitrailer pulling one or more full trailers. Each full trailer in this case consists of a semitrailer whose forward end is supported by a dolly. The typical dolly is called an A-dolly which (1) articulates in yaw relative to the semitrailer, (2) is connected to the towing unit by a single pintle hitch, and (3) has one or more axles which are nonsteering relative to the dolly frame. These dollies typically perform well at low speeds but at higher speeds become less stable than conventional tractor trailer vehicles and have exhibited comparatively poor rearward amplification performance. In an attempt to identify other more stable dollies, FHWA is evaluating innovative dolly concepts including a steerable axle C-dolly (two pintle hitches). This work is being closely coordinated with NHTSA for possible follow-on should the need for performance standards arise.

Description: A- and C-dollies will be evaluated in terms of design, performance, use, cost, reliability, and weight. Specifications will be developed for two or three classes of dollies. Computer simulations will be used to take truck combinations through as many as seven highway maneuvers. Truck performance with the specified dollies will be evaluated. A particular class of dolly can then be assigned to a selected class of truck/trailer combination in order for the combination to meet preselected performance goals.

Lead Agency: FHWA

Milestones: Continuing through July 1991

DRIVER/VEHICLE INTERACTION RESEARCH PROGRAMS

Driving a heavy truck is a difficult task. The vehicle is large, its handling and stability response characteristics are ponderous compared to cars, and it is difficult for the truck driver to see other vehicles operating in close proximity to the truck. For this reason, vehicle design characteristics that assist truck drivers in their efforts to avoid crashes are a key to improving truck safety. In particular, design improvements associated with lights (markers, turn signals, brake lights, etc.), visibility (blind spots), conspicuity (use of retroreflective materials), and a variety of applications of high technology (navigation systems, warning systems, etc.), can help reduce the likelihood of heavy truck crashes.

Nonlighted Conspicuity Enhancement

Background: An examination of crash data reveals that many car-into-truck crashes, especially those at night, often involve a failure to see the truck until just prior to impact. Enhancing the nonlighted conspicuity of heavy trucks can reduce the occurrence and severity of these crashes. Trucks treated with these retroreflective materials can be seen even if the truck's lights fail. Many of these crashes occur in situations where visibility is degraded (e.g., fog, nighttime, etc.) and/or the profile of the truck is minimal (e.g., flatbed). Given the availability of a wide range of retroreflective and other nonlighted conspicuity enhancing materials, performance requirements can be developed for improving the visibility of heavy trucks so as to reduce the likelihood and severity of this type of crash.

In November 1990, Congress enacted the "Sanitary Food Transportation Act of 1990." This Act includes a mandate to "initiate rulemaking proceeding on the need to adopt methods for making trucks or any category of trucks more visible so as to reduce accidents..." The Department is to complete the proceeding before November 1992.

Description: Preliminary research has shown that improving truck conspicuity can reduce the incidence of car-into-truck crashes. NHTSA is considering whether to require nonlighted conspicuity enhancing treatments. Research is continuing to further establish performance requirements of these conspicuity enhancing treatments, e.g. retroreflective tape and to support potential rulemaking.

Lead Agency: NHTSA

Milestones: Regulatory Decision 1991

Driver Visibility

Background: A variety of conventional and high-technology driver aids directed specifically at improving visibility for heavy vehicle drivers have the potential to significantly mitigate crashes involving a truck driver's inability to detect other vehicles alongside or behind his vehicle. These aids are supplements to conventional mirrors and typically consist of extra field-of-view mirrors, closed circuit TV systems or a variety of electronic object detection systems.

Description: As part of NHTSA's overall Intelligent Vehicle/Highway Systems (IVHS) research program effort, a study will be initiated to evaluate various visibility enhancing and object detection technologies. The intended research will identify those devices that are potentially effective in mitigating crashes involving driver's inability to detect the presence of other vehicles or objects, and identify performance requirements. The research will include obtaining data describing truck driver visibility needs in terms of what objects need to be seen to avoid crashes, where the objects are located, and when they need to be seen. An evaluation protocol for truck indirect visibility systems, similar in concept to the protocol under development for passenger vehicle mirror systems, will also be developed. The availability of an evaluation protocol is a necessary first step towards establishing minimum performance requirements for truck visibility systems.

Lead Agency: NHTSA

Milestones: Initiate solicitations of research
contract to establish visibility needs
and develop an evaluation protocol

May 1991

Award research contract

September 1991

High Technology Driver Information Systems

Background: Advances in electronics have increased the technical feasibility of developing vehicle systems that can assist drivers in preventing crashes. It is conceivable, for example, that "driver copilot" devices can be developed that can warn drivers of imminent rollover, various roadway hazards, excessive speed for current road conditions, unsafe lane drifts, driver fatigue, etc. Also, developments in electronic technology have resulted in the availability of numerous types of instrumentation for use by truck drivers, including engine diagnostics, dispatch messages, trip status (maintenance schedules, fuel economy, tachograph data), vehicle position, and route selection. Display formats for all these devices need to be evaluated for their match to drivers' capabilities, the workload and/or distraction they may create, and the benefits or disbenefits they may provide.

Description: This area is still under development within the agency. An analysis of accident data will be undertaken to identify what types of devices would be needed to prevent different types of crashes. In addition, an assessment of the state-of-the-art of electronic technology will be conducted to identify technologies that can be applied to crash avoidance in the near future. This will be based on the recommended approach of a recently completed study ("Supplemental Electronic In-Cab Displays") to provide a standardized workload assessment methodology, human factors guidelines, and safety-related performance criteria. Based on the results of these efforts, several crash avoidance applications will be identified for development and evaluation. Various issues will be examined, including the extent of driver performance improvement, problems from changes in driver risk taking behavior and "automation complacency," and driver acceptance. The results of these studies will provide information on requirements for effective crash avoidance devices and for decisions regarding implementation strategies. In addition, research to develop information for truck manufacturers and users to help them specify and buy the most inherently stable vehicles and to inform them of operating procedures that contribute to rollovers will be undertaken.

<u>Lead Agency:</u>	NHTSA and FHWA	
<u>Milestones:</u>	Award research contract for assessing driver warning systems	May 1991
	Award research contract for performing workload assessments	June 1991

OCCUPANT PROTECTION RESEARCH PROGRAMS

Approximately 900 heavy truck occupants and over 4,000 occupants of other vehicles are killed in heavy truck crashes each year. The primary mechanisms responsible for the majority of truck occupant fatalities are rollover, ejection, entrapment in crushed cabs, contact with interior surfaces, and fires. Many of these fatalities occur in single-vehicle truck crashes which involve running off the road and hitting fixed objects, simple on-road overturning, jackknifing, and collisions with low roadside structures such as guard-rails, sign posts, and embankments. The rate of occupant fatalities for other vehicles involved in heavy truck crashes is increased by the typically greater weight, momentum, and structural stiffness of the heavy truck.

Improved Safety Belts

Background: Currently, only two-point safety belts are required in heavy trucks, and there is an FHWA requirement that operators use them. However, belt use is only about 6 percent according to the latest survey data. Among the reasons drivers give for not using belts are that the belts become tangled and dirty in a truck cab environment, and that they are uncomfortable because of truck cab and seat motion. Two-point belts do not provide restraint of an occupant's upper torso.

Description: The problem of low belt use may be alleviated in part by a new NHTSA requirement for more easily accessible lap belts (or pelvic portions of lap-shoulder belts). In May 1990, NHTSA issued a final amendment to the occupant restraint standard that requires retractors on two-point safety belts. This rule became effective on September 1, 1990.

NHTSA is considering whether to require three-point belts in heavy truck and bus cabs for the additional occupant head, neck, and torso protection.

NHTSA is also participating with the SAE Crashworthiness Subcommittee to define a representative "composite" crash pulse (deceleration-time history) for subsequent use in simulation models of heavy truck occupant dynamics in crashes. This crash pulse will be used as a metric against which restraint systems and other vehicle components could be evaluated. The Subcommittee's goal is the establishment of simplified evaluation test procedures without the need for full-scale crash testing.

<u>Lead Agency:</u>	NHTSA	
<u>Milestones:</u>	Regulatory decision on three point belts	1991
	Define composite crash pulse	1993

Post-Crash Fires

Background: A 1989 NHTSA Report to Congress entitled "Heavy Truck Fuel System Safety Study" found that while truck fires are rare, truck fuel systems are frequently breached in crashes. The report suggested that an incremental reduction in the number of truck fires fed by breached truck fuel systems could be achieved by a combination of relocating and strengthening various components on trucks. It was further suggested that, at a minimum, battery boxes be located away from fuel tanks and that thought be given to fuel crossover lines between tanks, i.e. either eliminate or make them less vulnerable to rupture. Strengthening fuel tanks was also suggested to make them better able to resist rupturing and puncturing impact forces as well as abrasion.

Description: The agency will design a research program covering other aspects of post-crash fires before proceeding with substantive efforts in this area. This program may include: better definition of the problem through in-depth analyses of accidents; cooperative development with component suppliers of stronger tanks, fittings, etc.; and development of standardized test procedures for evaluating the effectiveness of these improved systems.

Lead Agency: NHTSA

Milestones: Agency decision on rulemaking May 1991
and/or pursuit of research

Cab Integrity

Background: Heavy truck occupants may be lethally entrapped in crashes, especially when rollovers occur. It is difficult to ascertain directly from crash data files whether or not a death occurred because the cab crushed in around the occupant. NHTSA's Section 217 study used entrapment as a surrogate measure to estimate the proportion of crashes in which severe cab crush occurs. Using this surrogate measure, approximately 25 percent of heavy truck occupant fatalities are associated with cab crush. A 1982 NHTSA study estimated these fatalities could be reduced by 27 to 51 percent through improved cab structural integrity. There is no doubt that cab structures can be incrementally strengthened. For instance, indications are that universal application of the current Swedish standard (which consists of a roof strength test, a pendulum impact of the A-pillar, and a pendulum impact of the rear wall) would result in an approximate doubling of U.S. cab strength. It is not clear, however, the extent to which this added strength would reduce fatalities. Another aspect of this issue is that improved door latch/sill structural integrity could enhance heavy truck occupant survivability.

Description: This project represents a long-term research effort to improve cab integrity. The first step will focus on in-depth accident reconstruction and analyses to determine the magnitude of impact forces, the directions in which these forces are applied, the damage severity associated with these impact forces, and the trauma mechanisms associated with these impacts. This would allow a relationship between cab strength and fatalities and injuries to be developed. After completion of this effort, the agency will assess what further actions would be appropriate.

Lead Agency: NHTSA

Milestones: Accident Reconstruction
Continuing through 1994

Interior Structures/Components

Background: Approximately 40 percent of heavy truck occupant fatalities are associated with secondary impacts with objects/surfaces on the interior of truck cabs. Greater safety belt usage and/or improved belt systems would mitigate much of this problem. As a complementary approach, this project would include efforts to retain windshields in their frames, to remove sharp objects and to "soften" steering wheels and dashboards/headers. (The heavy truck steering wheel is not similar to passenger car wheels and engenders a different set of problems.)

Description: This project represents a long-term research effort intended to reduce heavy truck fatalities by upgrading interior structures and components. Research would first focus on the means and merits of applying glazing bonding techniques. Following completion of the windshield research, steering wheels and interior components would be considered.

Lead Agency: NHTSA

Milestones: Complete research plan
May 1991

Aggressivity

Background: Each year, over 4,000 light vehicle occupants die each year in collisions with heavy trucks, the greatest proportion involving collisions with the front structure of the truck. Of course, the mass differentials cannot be changed and occupants of the lighter vehicles will always be at a disadvantage. However, height mismatches and stiff nonyielding truck structures could be changed. European research has shown that incremental improvements in the amount of harm inflicted on car occupants may be possible through modifications to the designs of heavy trucks, especially their frontal structures. Such modifications include lower bumpers and energy-absorbing structures on the front of heavy trucks.

Description: A feasibility analysis is underway that will result in the definition of an orderly program in heavy truck aggressivity research.

Lead Agency: NHTSA

Milestones: Complete research plan
May 1991

Rear Underride Protection

Background: In 1988, about 400 passenger car and pickup truck occupant fatalities occurred because of collisions into the rear end of heavy trucks. Many of these crashes resulted in the striking vehicle underriding the rear of the truck. Underride crashes can cause the passenger compartment of the lighter vehicle to be penetrated and damaged by the truck's frame. Although FHWA has a standard for underride guards for trucks in interstate commerce, there has been interest in having NHTSA upgrade this requirement and expand its coverage to all trucks.

Description: NHTSA is considering proposing equipment and vehicle standards for regulating the installation of suitable rear underride guards for various types of newly manufactured trailers. The equipment standard would require that rear underride guard manufacturers satisfy specified performance criteria by requiring each guard to pass a static test while attached to a standardized rigid test fixture. The vehicle standard would require trailer manufacturers to comply with guard installation and configuration requirements. FHWA will then have the option of amending its Federal Motor Carrier Safety Regulation to adopt the proposed NHTSA regulation.

Lead Agency: NHTSA

Milestones: Regulatory Decision 1991

IN-SERVICE PERFORMANCE EVALUATION RESEARCH PROGRAMS

Roadside Inspection Procedures

Background: Roadside inspections are important for identifying commercial vehicles which are not in compliance with Federal Motor Carrier Safety Regulations and, in particular, those which are imminently hazardous (out-of-service violations). Therefore, it is important to have adequate screening procedures and equipment to identify vehicles with problems as well as to conduct more detailed vehicle inspections.

Description: FHWA is performing research to determine if the procedures and/or equipment used in conducting roadside inspections are adequate. The research will correlate accident data, number of out-of-service vehicles, and frequency of inspections to determine what if any relationships exist. New performance standards will be developed where necessary and inspection procedures and/or equipment will be tailored to meet these standards. The study will also submit a report which includes a model for planning and operating a roadside vehicle inspection program.

Lead Agency: FHWA

<u>Milestones:</u>	Evaluate current techniques for planning and operating a roadside vehicle inspection program	May 1991
	Perform assessment of analytical inspection procedures	July 1991
	Perform assessment on the adequacy of brake inspection procedures	September 1991
	Evaluate effectiveness of CVSA inspection procedures	1992
	Completion of report	1992

Effectiveness of Brake Adjustment Indicators

Background: Heavy vehicle brakes need to be adjusted frequently; how frequently depends upon the particular vehicle operation. Brake systems are difficult to visually inspect because they are often concealed or are inaccessible to roadside inspectors.

Description: FHWA plans to study motor carrier use of heavy vehicle brake adjustment indicators and automatic slack adjusters. FHWA also plans to develop informational and advisory material (e.g. pamphlets, brochures) to help motor carriers and inspectors understand the proper use of these indicators and adjusters. The research will assist in developing inspection guidelines to determine if this equipment is functioning properly.

Lead Agency: FHWA

<u>Milestones:</u>	Implement study	1993
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CVSA Inspection Procedures for Checking Antilock Brake Systems

Background: Many manufacturers have been voluntarily installing antilock brake systems on heavy trucks even though vehicle standards do not require it at this time. As a result, more heavy vehicles equipped with antilock braking systems are showing up in roadside inspections. Currently, CVSA roadside inspection procedures do not specifically address the operational condition of antilock brake systems.

Description: FHWA research is planned to evaluate the adequacy of current CVSA inspection procedures with regard to detecting inoperable or malfunctioning antilock braking systems. The research will also help in the development of inspection criteria for antilock brake systems.

Lead Agency: FHWA

Milestones: Implement study 1993

Tire Tread Depth

Background: In order to maintain stability and stopping distance performance of heavy trucks in wet weather, it is necessary to have not only properly adjusted brakes but also good traction with the road surface. One important factor which determines the degree of traction, especially in wet weather, is the depth of tire tread. Lack of sufficient tire tread depth will prevent the channeling of water away from the tire-road interface and may cause the tires to lose contact with the road surface. This phenomenon is commonly called hydroplaning.

Description: FHWA is responsible for determining the minimum acceptable tread depth on both the front and rear tires of the tractor and trailers in order to reduce the risk of hydroplaning. Research is planned in order to develop minimum tire tread depth regulations and driver information that will reduce the frequency and severity of hydroplaning.

Lead Agency: FHWA

Milestones: Implement study 1992

Downhill Braking

Background: FHWA's Office of Motor Carriers (OMC) is very interested in assuring that motor carriers maintain braking systems and keep them in proper working order. Downhill testing will provide the scientific data necessary to develop guidelines for maintaining heavy truck and bus brakes. Downhill testing is necessary to help determine effective brake application techniques to reduce fading due to overheating.

Description: The work would consist of mountain descent tests using various vehicles, braking strategies, and levels of brake adjustment. This would require a test site and facilities, drivers and instrumented and prepared vehicles for the tests. During the course of the tests the investigators would study the effects of constant light pressure braking application versus snubbing applications by air braked vehicles on steep grade highways. In addition, they would be studying and gathering data on the effect that out-of-adjustment brakes have on the remaining properly adjusted brakes of vehicles on steep grades. At least three types of heavy duty commercial motor vehicles are to be equipped with instrumentation and tested.

Lead Agency: FHWA

Milestones: Implement study 1991

CARGO HANDLING

Cargo handling plays an important role in heavy truck safety, both from a precrash and post-crash standpoint. One of the variables that potentially diminishes a truck's handling and stability characteristics is the cargo area configuration of the truck or trailer. Aerodynamic, structural or operational qualities of particular trailer designs can offset or initiate the occurrence of an accident. In addition, the way cargo is loaded or secured within the trailer can greatly affect the dynamic stability of large trucks and may cause unexpected and/or aggravated loss of vehicle control.

Accidents that involve trucks hauling hazardous materials are of particular concern because of the potentially serious consequences of post-crash cargo spillage. Post-crash fires, explosions, toxic spills, and other environmental disruptions can endanger a great many people. An FHWA study (1977) reported that truck accidents involving hazardous cargo resulted in 22 percent more fatalities per accident and 61 percent greater property damage per accident than did all other truck accidents.

CARGO HANDLING SAFETY PROGRAMS

Cooperative Hazardous Materials Enforcement Development

Background: RSPA participates in an outreach program called the Cooperative Hazardous Materials Enforcement Development (COHMED). COHMED was created to foster coordination, cooperation, and communication between Federal and State agencies and tribal nations having regulatory and enforcement responsibilities for the safe transportation of hazardous materials. COHMED will play an increasingly important role in light of the complex and expanded regulatory requirements set forth in the Hazardous Materials Transportation Uniform Safety Act of 1990.

Description: COHMED has sponsored regional and national workshops to bring hazardous materials enforcement and emergency response issues to the attention of State enforcement personnel and department heads. The results of special studies conducted in selected States will be used to improve programs nationally. Training aids and informational services are also exchanged between COHMED and the States. COHMED publishes both a newsletter, the "Reporter," and a topical brochure called "Bullets."

Lead Agency: RSPA

Milestones: On-going program

Hazardous Materials Program Countermeasures

Background: The FY 1990 Appropriations Bill directed the FHWA, in cooperation with RSPA, to actively participate in raising both the quality and quantity of State hazardous materials compliance and enforcement activities. Specifically, instructors from the Transportation Safety Institute in Oklahoma City, Oklahoma, FHWA hazardous materials program managers, and other FHWA and RSPA headquarters personnel were instructed to substantially increase the training programs, technical assistance, and information sharing offered to State MCSAP and other enforcement officers who conduct hazardous materials inspections at roadside and in carrier and shipper facilities.

Description: FHWA and RSPA personnel will continue to coordinate their hazardous materials training programs. In order to enhance its involvement in COHMED, FHWA regional Hazardous Materials Program Managers are participating on various COHMED committees to increase program effectiveness. FHWA also coordinated with the Transportation Safety Institute in offering training programs to MCSAP officials in FY 1990. These training programs are in the areas of Hazardous Materials Compliance and Enforcement, Cargo Tank Roadside Inspections, and Awareness Training for Initial Response for Hazardous Material Incidents. The FHWA will identify current hazardous materials data sources and identify leading causes of hazardous material incidents. Countermeasures to mitigate or eliminate such risks will also be identified.

Lead Agency: FHWA

Milestones: On-going program

Implement study on HAZMAT incident countermeasures	1992
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Modular Compliance and Enforcement Program

Background: RSPA, the Hazardous Materials Advisory Council (HMAC), and Cooperative Hazardous Materials Enforcement Development (COHMED) in a cooperative effort are developing a series of hazardous materials training packages (modules). Safe transportation of hazardous materials will be enhanced through a series of "public domain" training packages that translate the hazardous materials regulations into operational procedures.

Description: The modules are practical, self-instructional or instructor-lead units for shippers, carriers, responders, or enforcement audiences. They are written to be easily understood and to build confidence in the use of hazardous materials regulations. Each module will contain instructor manuals, student workbooks, 35mm slide programs and audiotaped instructions.

Lead Agency: RSPA

<u>Milestones:</u>	Released and distributed first 6 modules	December 1990
	Update modules	As needed

Hazardous Materials Information Exchange

Background: The Hazardous Materials Information Exchange (HMIX) is a computer bulletin board which is maintained and updated by RSPA. The HMIX was designed to enable users to exchange information on a variety of hazardous materials topics.

Description: The HMIX provides up-to-date information on available training and on regulatory changes. The information exchange is available through a personal computer, modem, and communications software. Information on the cost-free use of the HMIX is available from RSPA's technical assistance operators at: 1-800-PLANFOR (752-6367); [Illinois residents: 1-800-367-9592].

Lead Agency: RSPA

Milestones: On-going program

Emergency Response Guidebook

Background: RSPA has published information on appropriate emergency responses to hazardous materials incidents since 1973. The "Emergency Response Guidebook for First Response to Hazardous Materials Incidents" was developed and printed by RSPA and has been nationally distributed (free of charge) to public sector response vehicles since 1980. RSPA has distributed over 2.7 million copies of these guidance documents. These documents have been updated and revised every three years to reflect the latest regulatory information and state of the art response procedures to hazardous materials transportation incidents.

Description: RSPA solicits comments from the public and private sector concerning each revision of the Emergency Response Guidebook.

Lead Agency: RSPA

Milestones: Revise and republish Guidebook every three years

Cargo Tank Improvements

Background: On June 12, 1989, RSPA published a final rule to revise and clarify the Hazardous Materials Regulations pertaining to the manufacture, maintenance, and requalification and use of all Department of Transportation specification cargo tanks. The intent of this rule is to improve safety in the transportation of the bulk quantities of hazardous materials in cargo tank motor vehicle. The final rule requires: improved standards for cargo tank inspection and testing; new standards for tank manholes, valves, and closures aimed at reducing leakage and fire risk during rollover and other accidents; revised requirements for the structural integrity of tanks; and revised qualifications for people who manufacture, repair, inspect, and certify cargo tanks.

Description: After publication of the final rule, RSPA reviewed petitions for reconsideration and extended the effective date until December 31, 1990. The final rule contains a series of delayed implementation dates for various new requirements. The new requirements will be phased in over five years to allow for the development and testing of new equipment and to ease the burden on small businesses.

Lead Agency: RSPA

Milestones: Published amended final rule September 1990

CARGO HANDLING RESEARCH PROGRAMS

Priority Contact Criteria for Hazardous Materials Shippers

Background: The establishment of priority contact methodology was recommended in two independent reports prepared by the Office of Technology Assessment and the General Accounting Office. The need for a shipper contact methodology became more evident when the Department issued a July 1989 proposal to establish a safety permit system for motor carriers of explosives, materials toxic by inhalation, and high-level radioactive materials.

Description: FHWA will identify existing and potential sources of safety data on shippers, evaluate alternative methodologies for identifying high-risk hazardous materials shippers, and assess the potential application of the data and methodology in establishing priority contact hazardous materials shippers.

Lead Agency: FHWA

Milestones: Implement study 1991

ROADWAY SAFETY

The characteristics of a roadway can have a dramatic effect on safe truck performance. Road geometry, roadway barriers, signing, and other factors can affect both precrash and crash safety for medium and heavy trucks and the other vehicles around them.

The FHWA's Turner Fairbank Highway Research Center performs research and demonstration projects for improving the safe operation of vehicles on the nation's highways. Part of the Center's overall research is aimed at the improvement of commercial vehicle safety. This research includes evaluating existing highway geometric design guidelines to ensure that commercial vehicles can safely maneuver on the roadway thereby avoiding potential crashes. The Center is also establishing performance criteria for improved roadway barriers to ensure that if a commercial vehicle driver does lose control, the vehicle can be safely redirected back onto the paved surface.

ROADWAY SAFETY RESEARCH PROGRAMS

Highway Design and Traffic Operations

Background: Current geometric design criteria and signing guidelines are based predominantly on the physical and operating characteristics of passenger cars. In recent years, the truck size and weight limits have gone through significant changes. Twin trailer trucks with 28-foot trailers and tractor/semitrailers with 48-foot and 53-foot trailers are becoming increasingly prevalent in the traffic stream.

Description: An FHWA research program has been structured to review current geometric design criteria and operational guidelines, identify those that are critical to trucks, and make recommendations for changes where appropriate.

Lead Agency: FHWA

Milestones: Continuing

Roadside Safety

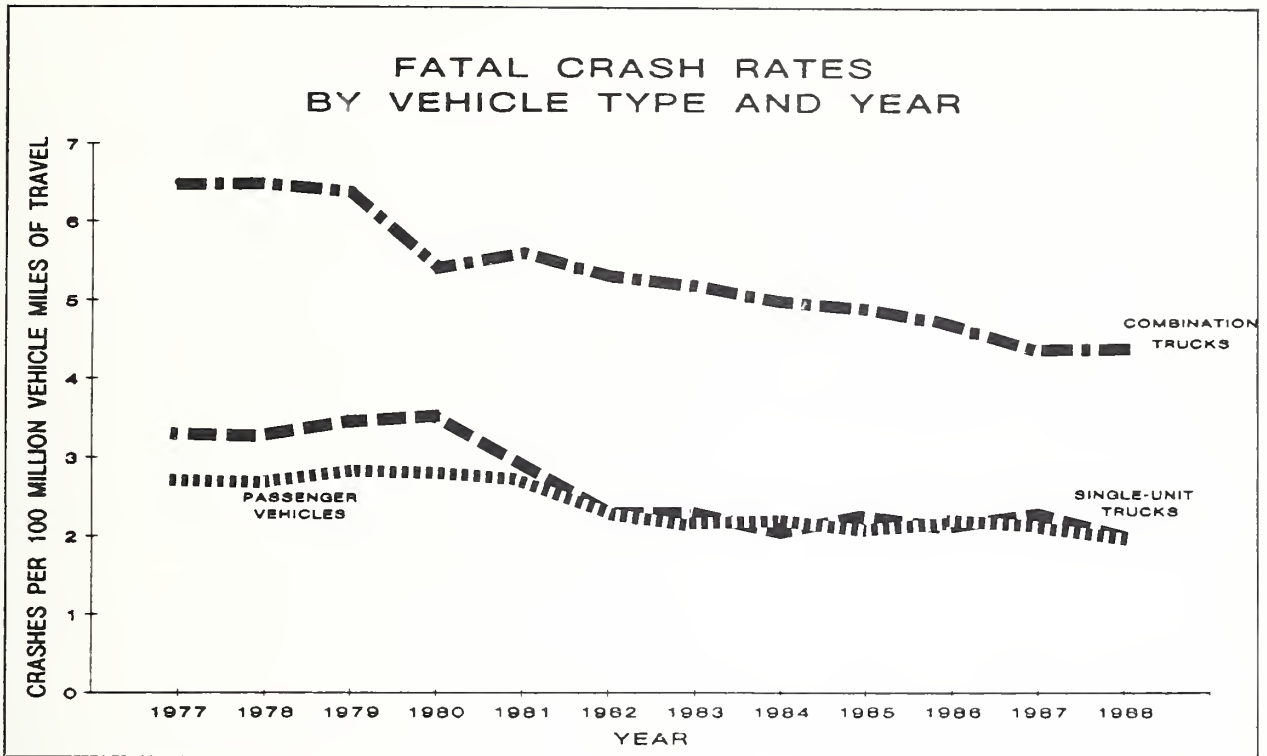
Background: Until recently, most longitudinal barrier systems were intended to safely redirect passenger cars only. With the significant increase in heavy truck volumes experienced on many highways, there is an identified need to develop barriers capable of redirecting large trucks.

Description: As part of an ongoing FHWA study, a number of bridge rail designs have been or will be crash tested using either 18,000-pound straight trucks or 50,000-pound tractor/semitrailer configurations [in accordance with a recently adopted American Association of State Highway and Transportation Officials (AASHTO) guide specification on bridge railings]. There is also a study underway under AASHTO's National Cooperative Highway Research Program to review and revise the current crash test procedures for all highway safety hardware. This effort will likely include the establishment of various performance levels for roadside hardware. This would call for the development and use of barriers (including but not limited to bridge rails) capable of redirecting large trucks where warranted.

Lead Agency: FHWA

Milestones: Continuing

ACCIDENT AND VEHICLE CONDITION DATA



The Department of Transportation has numerous data collection programs to collect information pertaining to the operation of heavy trucks on our nation's highways. Heavy truck data collection programs exist within NHTSA, FHWA, and RSPA.

Since its inception, NHTSA has been collecting crash data, including data on crashes involving heavy trucks. NHTSA's National Center for Statistics and Analysis (NCSA) is responsible for collecting and analyzing such data so that the agency can (1) define the magnitude of highway safety problems, (2) determine specific components of the problem in which a significant safety improvement is possible and countermeasures can be developed, and (3) evaluate the effects of safety countermeasures introduced into the vehicle/driver environment.

FHWA predominantly collects data pertaining to interstate commerce conducted by heavy trucks. Currently, the following offices within FHWA collect heavy truck data: the Office of Motor Carriers, the Office of Highway Information Management, and the Turner-Fairbank Research Facility. These data collection programs obtain information pertinent to truck operational statistics, such as crash statistics, safety performance of carriers, vehicle miles traveled by heavy trucks on various road classes, etc.

RSPA collects data related to the unintentional release of hazardous materials during transportation by all modes of transportation, including heavy trucks. The data are primarily collected to support RSPA's role in regulating the safe transportation of hazardous materials. Heavy truck accidents that result in the release of hazardous materials can be identified through the data and used in correlation with other DOT data systems to evaluate other safety concerns.

Short descriptions of the major heavy truck data collection systems that are currently established and are on-going programs within the Department of Transportation are outlined below:

Fatal Accident Reporting System (FARS): The FARS, a data system administered by the NCSA within NHTSA, collects general accident, vehicle, and person data on all fatal motor vehicle crashes, including truck crashes, that occur each year in the United States. Data are gathered from many sources, including police accident reports, coroner's reports, and vehicle and driver registration information. Once the reports are obtained, the data are recoded into a standard format.

National Accident Sampling System General Estimates System (GES): The GES, also administered by NHTSA's NCSA, collects general data, similar to FARS, from a nationally representative random sample of all police reported motor vehicle traffic crashes in the United States, including truck crashes. In 1988, GES obtained a sample of 49,000 police accident reports, approximately 7,000 of which involved heavy trucks, from the approximately 6.9 million police-reported motor vehicle traffic crashes which occurred that year. These crashes include all severity levels, from those in which there is a fatality to those involving only property damage. As in FARS, data from these reports were recoded into a standard format. However for GES the police accident report is the only data source used.

Motor Carrier Management Information System (MCMIS): The MCMIS is administered by the Office of Motor Carriers within FHWA. The overall purpose of MCMIS is to provide a computerized record of a carrier's operation, accidents, inspections and required enforcement to guide State-level safety programs. MCMIS accident data are limited to interstate motor carriers involved in crashes where property damage exceeds \$4,400 or injuries were involved. FHWA collects a detailed accident report, the 50-T, from all interstate carriers involved in crashes that meets this severity level. The 50-T report provides detail on the truck configuration and cargo. MCMIS also receives information about the performance of individual carriers nationwide through the developing SAFETYNET program (described on page 43).

Highway Performance Monitoring System: The Office of Highway Information Management within FHWA estimates the number of vehicle miles of travel (VMT) each year for different highway categories and vehicle types from data submitted by each State and the District of Columbia through the Highway Performance Monitoring System. The VMT estimates, along with statistics on motor fuel, motor vehicles, driver licensing, highway user taxation, State highway finance and Federal aid for highways appear in FHWA's annual publication, most recently Highway Statistics 1989, FHWA-PL-90-003.

Hazardous Materials Information System (HMIS): The HMIS, a data system administered by RSPA, collects data on the unintentional releases of hazardous materials during transportation by air, highway, pipeline, rail, or water. RSPA collects a detailed incident report, DOT F 5800.1, from each carrier who experiences an unintentional release that contains information on the material released; the carrier, shipper, and consignee; the location of the release; the container type, specifications, and part that failed; and the cause and contributing factors of the release. Data related to accidents involving the release of hazardous materials being transported by heavy trucks can be extracted from the system.

ACCIDENT AND VEHICLE CONDITION DATA SAFETY PROGRAMS

Adoption of National Governors' Association Data Elements

Background: Each State has its own police accident report (PAR) form and accident records system. Since most States collect limited information on the trucks and buses involved, there are no reliable, uniform, and comprehensive data on the hundreds of thousands of truck and bus crashes that occur each year. The National Governors' Association (NGA) Center for Policy Research developed recommendations for providing more uniform data collection. These NGA recommendations included the development of 23 common data elements with uniform reporting thresholds and definitions. These data collection techniques were field tested in five States during the summer of 1988 and, upon completion, appropriate modifications were made.

Description: Under a 1989 contract with the FHWA, the NGA is assisting States with the implementation of the recommended data elements. The FHWA anticipates that uniform data collection will aid safety and compliance reviews of interstate motor carriers by providing the names of carriers with the poorest safety records. The NGA data elements have also been endorsed by the National Association of Governors' Highway Safety Representatives and the Transportation Research Board. FHWA is also developing self-contained instructional materials and visuals on why and how to collect the common data elements. "Train-the-trainer" courses are being developed for personnel who will eventually teach the NGA data collection methods.

Lead Agency: FHWA

Milestones:	NGA data elements adopted in 16 States	1990
	NGA data elements adopted in 30 States	1991
	Complete training materials	July 1991

Adoption of SAFETYNET Modules

Background: SAFETYNET is a cooperative effort to share commercial motor carrier safety data electronically among States and the FHWA. Information about the individual carriers nationwide is available and can be used to effectively manage and direct Federal and State commercial vehicle safety programs. Under MCSAP, States can collect both roadside inspection and accident data and enter these into their State data bases. Most States use microcomputer software provided by FHWA; however, some States develop and maintain their own systems.

Description: As of May 1991, 46 States were using the SAFETYNET inspection module. Nineteen of these States were using the accident module. Through MCSAP, FHWA is actively encouraging all States to show a "good faith effort" in implementing the accident module by FY 1992. Other possible SAFETYNET modules being considered are commercial driver information, and truck size and weight.

Lead Agency: FHWA

Milestones:	Installation of SAFETYNET inspection module software by all States	On-going
	Good faith effort in implementing the SAFETYNET accident module by all States	On-going

Highway Safety Information System

Background: FHWA's Highway Safety Information System (HSIS) contains State collected motor vehicle (including heavy trucks) accident data, roadway inventory data, and traffic volume data. The HSIS was developed to provide the FHWA with a roadway-based system for tracking accident trends, developing experimental designs for future research studies and providing answers to questions concerning relationships between accidents and highway geometrics.

Description: The current HSIS system consists of three years of data from five States. The data base will be expanded as additional years of State data become available. The system is unique in that it contains linked files of accidents, traffic volumes, and roadway inventory data. Having the traffic volume data linked to the accident data provides needed exposure information so accident rates on different sections of highways may be calculated. The roadway inventory data provides essential details (which are not available in the accident files) for studying highway-related issues. For example, the traffic, accident, and roadway data may be combined to identify roadway conditions that create safety and operational problems for large trucks.

Lead Agency: FHWA

Milestones: On-going program

ACCIDENT AND VEHICLE CONDITION DATA RESEARCH PROGRAMS

Trucks Involved in Fatal Accidents

Background: FHWA and NHTSA both collect data on heavy truck crashes. Unfortunately neither of the data files can provide a complete description of the accidents and contributing factors. FHWA, NHTSA, and RSPA are concerned with providing a more comprehensive description of fatal accidents involving large trucks.

Description: FHWA, NHTSA, and RSPA will produce a fatal accident database for large trucks by combining NHTSA's FARS with the detailed vehicle description provided by FHWA's Motor Carrier Accident Report (MCS 50-T). The project would include merging the FARS and MCS 50-T accident records; obtaining police accident reports and conducting follow-up surveys; data processing of accident reports; and identification of factors associated with the risk of accident involvement for large trucks, including vehicle performance, size and weight, driver fatigue, hazardous materials, etc. Also included is a special analytical topic on hazardous materials.

Lead Agency: FHWA, RSPA, and NHTSA

Milestones:	Initiated research activity with the University of Michigan Transportation Research Institute (UMTRI)	July 1990
	Complete new accident database	1993
	Annual synthesis of new accident database	On-going

Enhancement of NHTSA's Heavy Truck Data

Background: The NCSA's GES collects general data from a nationally representative sample of all motor vehicle crashes. GES obtains data across the crash severity spectrum from property damage only, up to and including fatal. In 1988, the GES collected approximately 49,000 police accident reports, of which 2,200 involved heavy truck crashes.

The OMC is particularly interested in the statistics on the interstate carriers it regulates. The GES system is a potentially valuable source of sound accident data for the validation of the more detailed, but statistically questionable, accident information maintained in the OMC/MCMIS data collection system.

Description: Supplementary collection of heavy truck data by the GES system would provide an independent check on the MCMIS data and also provide an independent source of statistically valid accident data. The OMC will fund NHTSA to enhance the GES program for the collection and coding of an additional 7,500 police accident reports that involve heavy truck-related crashes.

Lead Agency: NHTSA

Milestones: Report 1990 enhanced GES data collection December 1991

Virginia Demonstration Project

Background: Virginia is one of the few States that systematically collects detailed information about all State police investigated heavy truck crashes within the State. These data include information on the type of trip, type of cargo, driver experience, driver condition as well as truck configuration and type of trailer. By using these detailed crash data along with number of miles driven data, very detailed crash distributions and involvement rates for different types of heavy trucks could be produced for Virginia.

Description: NCSA is currently converting the Virginia enhanced truck accident data to an automated file, with about 2,500 cases per year. A project to collect exposure data in Virginia, using roadside observations and truck stop interviews, is in the design phase, with data collection beginning in March 1991. This demonstration project will define the truck crash experience in Virginia and can be used to develop a model for other States' truck safety efforts. In addition, the relative involvement rates produced by this effort could be used to define the heavy truck safety problems that may be relevant to the entire United States.

Lead Agency: NHTSA

Milestones: Crash data analysis became operational June 1990
Complete exposure data collection and analysis December 1991
Project completion 1992

GLOSSARY OF ABBREVIATIONS

AAMVA:	American Association of Motor Vehicle Administrators
AASHTO:	American Association of State Highway Transportation Officials
CAPE:	Commercial Accident Prevention and Evaluation
CDL:	Commercial Driver's License
CDLIS:	Commercial Driver's License Information System
COHMED:	Cooperative Hazardous Materials Enforcement Development
CR:	Compliance Review
CVEPP:	Commercial Vehicle Enforcement Pilot Program
CVSA:	Commercial Vehicle Safety Alliance
DOT:	United States Department of Transportation (Secretary: Secretary of Transportation)
ETA:	Educational and Technical Assistance
FARS:	Fatal Accident Reporting System (NHTSA)
FHWA:	Federal Highway Administration (DOT)
FMCSR:	Federal Motor Carrier Safety Regulations
FMVSS:	Federal Motor Vehicle Safety Standard
FY:	Fiscal Year
GES:	General Estimate System (NHTSA)
HMIS:	Hazardous Materials Information System
HMIX:	Hazardous Material Information Exchange
HSIS:	Highway Safety Information System
ICC:	Interstate Commerce Commission
IVHS:	Intelligent Vehicle/Highway System
MCMIS:	Motor Carrier Management Information System (FHWA)
MCSAP:	Motor Carrier Safety Assistance Program
NCSA:	National Center for Statistics and Analyses
NGA:	National Governors' Association
NHTSA:	National Highway Traffic Safety Administration
NPRM:	Notice of Proposed Rulemaking
NTP:	National Transportation Policy
OMC:	Office of Motor Carriers (FHWA)
PAR:	Police Accident Report
RSPA:	Research and Special Programs Administration
SAE:	Society of Automotive Engineers
SCE:	Selective Compliance and Enforcement
SR:	Safety Review
TSARC:	Transportation Systems Acquisition Review Council
TRB:	Transportation Research Board
VMT:	Vehicle Miles Traveled
VRTC:	Vehicle Research and Test Center

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